INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

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General

1. The Russkiy Dizel Plant is located at 15 Fokina Naberezhnaya, Stalinskiy Rayon, on the Bolshaya Nevka River in Leningrad. A branch line runs from the Finlyandskaya Freight Station on the Oktyabryskaya Railroad to the plant. A quay on the Nevka River permits ships to dock there. The Russkiy Dizel Plant belongs to the USSR Ministry of Heavy Machine Building and is directly controlled by the Chief Directorate of Locomobile and Diesel Engine Building.

History

2. The plant was founded in 1849 and prior to the Russian Revolution was owned by E. Nobel and Co. and was known as the Nobel Brothers Machine-Building Works of St. Petersburg. The first diesel engines, which were low-power, four-stroke, and paraffin oil-driven, were built in 1897. The first four-stroke, compressor diesel engines, which were crude oil-driven with a fuel consumption of 225 gr per hp/hour, were built in 1899. The plant started building two-stroke, compressor ignition engines in 1902, and in 1903 three-cylinder 120-hp and 240 rpm diesel engines were built. These were installed in the tanker VANDAL; each had electric transmission to the propeller. In 1906, the first of the two-stroke, compression ignition engines of 20 hp, with uniflow scavenging through a valve, was completed. In 1908, the plant built a reversible (reversivnyy) diesel for the submarine MINOGA. In 1912, a light diesel engine with eight cylinders in two V-rows was built, which generated 200 hp at 500 rpm and weighed ten kgs per hp. In the same year, the plant built a two-cylinder, two-stroke diesel engine of the 220 series, of 440 hp at 350 rpm. In 1915, the plant was producing two-stroke reversible engines developing 1,320 hp at 350 rpm for submarines. During the revolution, work on the construction of diesel engines almost ceased, and designing of engines was not resumed until 1922. In 1923, the plant produced a four-stroke, single-action compressor diesel engine, generating 400 hp at 187 rpm.

3. In 1925, a single-cylinder, vertical two-stroke, compressorless engine of the 2050 series was built. It developed 50 hp at 350 rpm with "loop scavenging" (petlevaya produvka) and a mean effective pressure of 3.7 kgs per sq cm. These were stationary-type engines, but some of 50 hp, 100 hp, and 150 hp were in-

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stalled in ships as auxiliary engines.

4. In 1926, two-stroke, six-cylinder, reversible compressor, crosshead-type engines of the 2126 series were built. These engines, which were designed for sea-going motor vessels, generated 750 hp at 185 rpm with a mean effective pressure of 4.7 kgs per sq cm, and fuel consumption of 200 gr per hp. Six of these diesel engines were produced, of which two were installed in the tanker AZNEFT, two in the tanker GROZNEFT, and two in a motorship on the Tumen River in Siberia. Ten engines of similar design, but of 500 hp, were built for textile factories in the USSR.

5. In 1927, heavy, two-stroke, low-speed compressor crosshead-type single-action diesel engines, which were called Nobel-RD-2400, were built. They developed 1,900 - 2,200 hp and 105 rpm, had six cylinders of 650 mm diameter, and a piston stroke of 860 mm. The average speed of the piston stroke was three m per second, and the weight of the engine was 250 tons. The weight to power ratio was 125 kgs per hp. These diesel engines were installed in the cargo-passenger and refrigerating motorships SMOLNYY, YAN RUDZUTAK, DZERZHINSKIY, KOOPERATSIYA, and SIBIR, and also in passenger motorships of the Crimea-Caucasus Line, including the ABKHAZIYA and the ADZHARIYA. Between 1930 and 1939, the engines installed in the ships were modernized, and the power raised to 2,500 hp at 180 rpm, with a fuel consumption of about 165 gr per hp/hour.

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7. In 1931, the plant started production of 6S-68 [redacted] diesels. These engines were two-stroke, crosshead-type with six cylinders developing 3,250 hp at 120 rpm. The diameter of the cylinder was 680 mm, and the piston stroke was 1,220 mm. It was fitted with an air-operated compressor-type atomizer and a three-stage compressor. The crank-shaft weighed 45 tons and was 14,480 mm long. The engine weighed 380 tons, was about ten m high, 4.37 m wide, and 15.5 m long. It was named after Stalin. Other diesels built from these designs were the 4S-68 and 3S-68. The first of these diesels was installed in the 6,500 ton motorship KIM. The diesel, which was fitted with reversing gear, was connected directly to the propeller. 25X1

8. Work began in reconstructing and expanding the Russkiy Dizel Plant in 1932. This was completed in 1934. During this period, the Plant was directly subordinate to the All-Union Combine of Heavy Machine Building (VOMT). Personnel numbered about 2,500 men, and, in 1934, diesel engines producing 180,000 hp were built.

9. In 1935-1936, during the Second Five-Year Plan, the Plant produced in series a light, high-speed, single-action, two-stroke, compressor diesel engine with crossheads, which was known as the 9DKV 51/55. This engine was modelled after the [redacted] diesel 9QN 51/55. Its specifications were: 3,000 hp, nine cylinders, 300 rpm, average speed of piston stroke 5.5 m per second, diameter of cylinder 510 mm, piston stroke 550 mm, weight 67 tons, and weight to power ratio 22.3 kgs per hp. The engine was fitted with a turbo-pump weighing about six tons used for feeding scavenging air at 1.35 atmospheres with two rotors driven by a 3,000 rpm DC electric motor, a twin-cylinder, four-stage crosshead-type compressor with a calculated output capacity for servicing two diesels, a fuel pump which was placed on the side of the engine, a geared oil pump for circulating lubricating oil, a geared oil pump for lubricating crank pins, oil pump for lubricating engine cylinders and compressor, and an electric drive for turning the shaft. 25X1

Prewar Production

10. The plant also produced, prior to World War II, a low-speed, two-stroke, single-action diesel engine type RK-30. These were stationary, compressorless diesel engines with chamber-atomized crude oil. The crude oil was atomized at a pressure of 100 atmospheres. The engines were started by compressed air and were water-cooled by means of a centrifugal pump. The details are as follows:

2 RK-30: 100 hp, 300 rpm; weight 7,350 kgs

3 RK-30: 150 hp, 300 rpm; weight 9,750 kgs

4 RK-30: 200 hp, 300 rpm; weight 11,950 kgs

6 RK-30: 300 hp, 300 rpm; weight 17,350 kgs

Considerable numbers of the first three types were delivered to oil fields for boring operations.

11. The plant serially produced the following two-stroke compressorless reversible marine engines.

a. D-1: 25 hp, single cylinders, 430 rpm, piston stroke 4.3 m per second, and weight to power ratio 71 kgs per hp.

b. D-2: 50 hp, two cylinders, 430 rpm, piston stroke 4.3 m per second, and weight to power ratio 51 kgs per hp.

c. 2D 19/32: 70 hp, two cylinders, 430 rpm, piston stroke 4.58 m per second, and weight to power ratio 35 kgs per hp.

d. 4D 19/32: 140 hp, four cylinders, 430 rpm, piston stroke 4.56 m per second, and weight to power ratio 26 kgs per hp.

e. 4DR 24/38: 240 hp, four cylinders, 375 rpm, piston stroke 4.75 m per second, and weight to power ratio 27 kgs per hp.

f. 6DR 29/50: 600 hp, six cylinders, 300 rpm, piston stroke 5 m per second, and weight to power ratio 40 kgs per hp

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12. Before World War II, the production of compressor diesel engines was stopped at the Russkiy Dizel and all other diesel plants. The Russkiy Dizel Plant switched over to the production of compressorless diesels and produced the first 8DR 48/61 diesel, the production of which has been continued in a modern form since the war. It also built the 90KR 51/55, which is still produced, and worked out plans for two-stroke, double-action diesels.

13. The plant was evacuated during the war and the buildings were used for war production. Some of the buildings were damaged by bombing. Many of the designers were transferred to other diesel plants, including the Dvigatel Revolyutsiy and Plant No. 38. Some with considerable experience in diesel designing, including M. Yu. Maslenkov, I. P. Matveyev, and P. N. Bitkin, were transferred to the Diesel Scientific Research Institute (Nauchno-Issledovatelskiyy Dizelnyy Institut = NIDT), where they were awarded Stalin prizes for designing diesel engines.

14. The plant was restored after the war, and, in 1946 and 1947, workers repaired the stationary and marine diesel engines, for which a special shop was built; this shop is still in use. The plant later produced DR 43/61 modern diesels, followed in 1948-1949 by DR 30/50, and later by 9DKR 51/55 high-speed diesels. In addition, a few 10DK 68/120 diesels with pressure feed, 8DKR 72/125, and two-stroke, double-action diesel engines of 10,000 hp were built. At the end of 1952, the plant started replacing steel with strong and malleable magnesium pig iron in the production of many diesel engine parts, such as connecting rods, pistons, geared wheels, and crankshafts. The head of the Central Laboratory,

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Meyerovich (fnu), and Engineer Berezin (fnu) were awarded a Stalin prize for planning and organizing the production of this iron.

Postwar Production

15. The 9DKR 51/55 high-speed, nine-cylinders, compressorless, two-stroke, single-action, reversible, diesel engine, a crosshead type with rotary scavenging pump operating from the crankshaft of the engine, was built after the war. Its details are:

Designers	M. Yu. Maslenkov, who until 1952 was chief engineer of the plant, and F. L. Melnikov.
Power	3,000 hp at 300 rpm. 4,200 hp at 400 rpm.
Diameter of cylinder	510 mm.
Piston stroke	550 mm.
Average speed of piston stroke	7.34 m per second.
Weight to power ratio	16 kgs per hp.
Fuel consumption	180 gr/hp/hour.
Pumps	Oil pumps for lubricating cylinders. Oil pump for lubricating crossheads. Pump with a separate electric drive for circulating lubricating oil and cooling pistons. Centrifugal water circulation pump with separate electric drive. Fuel pump.
Governor	An engine governor maintaining 150-400 rpm, which is fitted with a servomotor operating fuel pumps and has a special device for switching off fuel pumps in the event of a fall in pressure of circulating oil.
Bedplate	Steel.
Frame	Steel.
Starting arangement	When the engine is started, all cylinders at first work on compressed air; later the first five cylinders continue to work on air and four are switched over to fuel, and finally all work on fuel.

16. The DR-30/50 engine is a series-produced, two-stroke, single-action, compressorless, truck engine. The engines are produced with four, six, and eight cylinders. Both stationary engines and main reversible marine engines are produced. Stationary engines are called D-30/50. Details of the engines are:

a. 4DR-30/50 Engine

Cylinders	4 cylinders.
Power	320 hp at 240 rpm. 400 hp at 300 rpm.
Diameter of cylinder	300 mm.

Piston stroke	500 mm.
Average speed of piston stroke	4 m per second or 5 m per second.
Dry weight of engine	15 tons.
Weight to power ratio	46 kgs per hp or 37 kgs per hp.
Fuel consumption	185 gr/hp/hour.
Fuel oil	"Solar" oil.
Lubricating oil	"T" motor oil.
Length of engine	3,580 mm.
Width of engine	1,560 mm.
Height of engine	3,140 mm.

b. 6 DR 30/50 Engine

Cylinders	6 cylinders.
Power	600 hp at 300 rpm. 750 hp at 375 rpm.
Average speed of piston stroke	5 m per second or 6.25 m per second.
Dry weight of engine	18 tons.
Weight to power ratio	30 kgs per hp or 24 kgs per hp.
Fuel consumption	180 gr/hp/hour.
Fuel oil	"Solar" oil.
Length of engine	4,540 mm.
Width of engine	1,560 mm.
Height of engine	3,140 mm.

c. 8DR 30/50 Engine

Cylinders	8 cylinders.
Power	800 hp at 300 rpm. 1,000 hp at 375 rpm.
Average speed of piston stroke	5 m per second or 6.25 m per second.
Dry weight of engine	22 tons.
Weight to power ratio	27.5 kgs per hp or 22 kgs per hp.
Fuel consumption	175 gr/hp/hour.
Length of engine	5,500 mm.
Width of engine	1,560 mm.
Height of engine	3,140 mm.

These engines are equipped with a pump fuel atomizing system and latitudinal slot scavenging. The shafts are forged in one piece with an extra throw (koleno) for driving the scavenger pump. An air compressor working to 30 atmospheres is fitted on the upper lid of the pump.[1] The engines are installed on large vessels as auxiliary engines. On small ships they are either directly connected to the propeller or fitted with an indirect drive. Two of these engines may be installed in the shaft of a ship by means of a reducing gear and an electro-magnetic coupling (nufta) giving an output of about 2,000 hp; four engines per shaft will give an output of about 4,000 hp. In 1953, the plant produced several engines with magnesium iron shafts which were installed in ships for prolonged trials.

17. The DR 43/61 marine engine is a series-produced, two-stroke, compressorless, trunk-type, reversible engine. It is produced with four, six, and eight cylinders. The crankshafts are forged in two parts. The scavenging air is fed by a rotary pump at a pressure of 1.2 atmospheres. It has lateral slot scavenging and a pump atomizing at a pressure of 250 atmospheres. The engine is started by compressed air at a pressure of 30 atmospheres. The engine has a cast iron form and its pistons are oil cooled. The eight-cylinder engine has four two-plunger pumps for fuel feeding. The designers were N. A. Gostintsev and P. N. Bitkin. Details of the engines are:

a. 8DR 43/61 Engine

Cylinders	8 cylinders each of 430 mm diameter.
Power	2,00 hp at 250 rpm, 2,200 hp at 275 rpm (prolonged running is possible at these rpm.)
Average speed of piston stroke	5.1 m per second.
Weight to power ratio	35 kgs per hp.
Fuel consumption	175 gr/hp/hour.
Lubricating oil consumption	10 gr/hp/hour of "T" motor oil.
Mean effective pressure	5.1 kgs per sq cm.

Four of these engines can be installed in ships by employing reducing gear and electro-magnetic couplings. Single-propeller power is 8,800 hp and double-propeller power is 17,600 hp.

b. 6DR 43/61 Engine

c. 4DR 43/61 Engine

18. The 10DK 68/120 engine is based on the [redacted] design. This engine has partial charging pressure and generates 7,350 hp at 120 rpm. The admission of high pressure charging air is through a second row of ports. Scavenging air of normal pressure of 1.4 kgs per sq cm is admitted through the lower row of ports. The engine is furnished with an additional piston-type pump. 25X1

19. The 8DKR 72/125 engine is a low-speed, single-action, two-stroke engine, designed by I. P. Matveyev and G. A. Rudyavskiy. The power is about 6,000 hp at 130 rpm, and the average speed of the piston stroke is 5.2 m per second. Its weight to power ratio is about 70 kgs per hp.

20. A two-stroke, double-action, 10,000 hp diesel engine was designed by I. P. Matveyev, a Stalin Prize winner. The normal maximum power of the engine is 12,500 hp, but it can be raised in an emergency to 15,000 hp. It has 20 cylinders of 320 mm diameter, piston stroke of 440 mm, 600 rpm, weight of 66 tons, and fuel consumption of 185 gr per hp/hour. The engine is fitted with a scavenging centrifugal pump and additional pressure feed (nadduv).

21. An experimental low-speed, two-stroke engine with six cylinders and pressure feed is under construction at the plant. The calculated power is about 7,000 hp at 115 rpm.

Output

22. In 1954, the Russkiy Dizel Plant produced diesel engines of various types capable of turning out about 470,000 hp.

Disposal of Production

23. Diesel engines produced at the plant are installed in naval ships and merchant sea-going and river vessels. Stationary diesel engines are supplied to various enterprises both in the USSR and in Soviet Bloc countries.

Shops

24. Plant shops include the following:

First Machine Shop (mekhanicheskiy tsekh).

Second Machine Shop.

First Machine Assembling Shop (mekhanosborochnyy tsekh).

Second Machine Assembling Shop.

Diesel Repair Shop (tsekh remonta dizeley).

Fuel Accessories Shop (tsekh toplivnykh priborov).

Tool Shop (instrumentalnyy tsekh).

Iron Foundry (chugunoliteynyy tsekh).

Forge (kuznechnyy tsekh).

Thermic Shop (termicheskiy tsekh).

Experimental Shop (eksperimentalnyy tsekh).

Machine Repair Shop (remontno-mekhanicheskiy tsekh).

Repair and Building Shop (remontno-stroitelnyy tsekh).

Transport Shop (transportnyy tsekh)

Central Laboratory (tsentralnaya laboratoriya)

Power Shop (silovoy tsekh).

Personnel

25. The following are the chief personnel at the plant:

Director — Nikolay Mikhaylovich Ryabinin, who replaced Director Bazhemov three years ago.

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Chief Designer	Spirin (fnu), who is acting as Chief Engineer.
Chief Technologist	Laptev (fnu).
Chief Metallurgist	Tsygankov (fnu).

26. The plant employs about 4,200 workers in three shifts.

1. [redacted] Comment: Other available information largely confirms the details of the 8DR 30/50 diesel engine. These differences do appear: 25X1

Dry weight of engine	27.5 tons (max).
Fuel consumption	185 gr/hp/hr.
Length of engine	5,685 mm.
Width of engine	1,615 mm.
Height of engine	3,200 mm.

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[redacted] 25X1